Revision of the genus *Kanamarua* Kuroda, 1951 (Gastropoda: Colubrariidae) with the description of two new species

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ABSTRACT. The deep water genus *Kanamarua* Kuroda, 1951 is distinguished from the buccinid genus *Metula* H. Adams & A. Adams, 1853 on the basis of shell sculpture and protoconch morphology. The original description of the genus is translated from Japanese. We consider *Kanamarua* as belonging to Colubrariidae according to Okutani (2000: 500-501). Previously known only from the Indo-West Pacific, the range of the genus is extended into the West Atlantic.
Kanamarua adonis (Dall, 1919) is recorded from the Tanimbar Islands (Indonesia) and off Luzon and Mindoro Islands (Philippines), extending the range to the west and the south.
Kanamarua tazimai Kuroda, 1951 is reinstated as a distinct species and removed from synonymy with *K. adonis*, the original description is translated from Japanese.
Kanamarua rehderi Kilburn, 1977 and *Metula vicdani* Kosuge, 1989 are senior synonyms of *Kanamarua hyatinthus* Shikama, 1973, the taxon is briefly discussed with special attention to its wide geographic range. The species is recorded from Vanuatu Islands, extending the range in southwestern direction.
Metula boswellae Kilburn, 1975 is transferred to *Kanamarua*, based on conchological characteristics.
Kanamarua narcissisma sp. nov. (Indonesia and Australia) and *Kanamarua francroberti* sp. nov. (Guadeloupe) are here described.

INTRODUCTION

However described by Kuroda (1951: 69-70) as a distinct genus, *Kanamarua* became subsequently often regarded as a subgenus of *Metula* H. Adams & A. Adams, 1853. In the present paper we confirm *Kanamarua* Kuroda, 1951 as a distinct genus.
Kuroda (1951: 71) already mentioned some conchological characteristic with colubrariid affinities and also Okutani (2000: 501) placed the genus in Colubrariidae. We follow this opinion while waiting for anatomical evidence (pers. comm. Y. Kantor).
Indonesia harbours a rich biodiversity, which has attracted many naturalists and scientists, among them Georgius Everhardus Rumphius (17th century) and Alfred Russel Wallace (19th century). The deep sea fauna, however, has received much less attention. In this context, the Muséum national d'Histoire naturelle (Paris, France) and LIPI (Indonesia) cooperated in a survey of the eastern part of the archipelago in order study the deep water benthos. Important material reported on in the present study originates from the KARUBAR expedition to Indonesia conducted in 1991. The KARUBAR expedition is part of the still ongoing sampling programme to study the tropical deep-sea benthos in the Indo Pacific for a better knowledge of the biodiversity. We refer to Crosnier et al. (1997) for a narrative of this cruise and station lists.
The Philippines are the hotspot of marine biodiversity. The unique character of this fauna is shown by the impressive number of molluscan groups and species collected in the last decade. The *Kanamarua* species from the Philippines reported on in the present study originate from the MUSORSTOM expeditions conducted by the Muséum national d'Histoire naturelle (Paris, France) and the efforts of Conchology Inc. (Cebu, Philippines).
In April 2002 a remarkable shell was dredged off Guadeloupe by Francis Robert during his activities as a fisherman. It took until 2006 to find a second specimen and we may call it "a rare species". A third specimen was collected more recently, in May 2007,

providing sufficient material for a comparative study and allowing us to describe the species. Morphology of the protoconch, sculpture and pattern of the teleoconch as well as apertural shape serve as criteria to assign this species to the genus *Kanamarna* Kuroda, 1951. The range of the genus is hereby extended from mainly Indo-West Pacific towards the Atlantic.
Metula boswellae Kilburn, 1975 is a well know species and became, due to the beautiful pattern and colour, one of the classic buccinids from southeastern Africa. In the present paper this species is transferred to the genus *Kanamarna* on the basis of its shell sculpture and protoconch morphology.

The material reported on in the present study originates from:

(a) CORINDON 2 expedition to Makassar Strait conducted in 1980.
(b) KARUBAR expedition to Indonesia conducted in 1991.
(c) MUSORSTOM 2 and MUSORSTOM 3 expeditions to the Philippines conducted in 1980 and 1985.
(d) MUSORSTOM 8 expedition to Vanuatu conducted in 1994.
(e) by-catch of commercial fishing vessels operating off South Africa, Mozambique, Somalia, Japan, China, Philippines and Australia.
(f) shells caught by local fishermen in Guadeloupe.
Material from the French expeditions is, unless otherwise stated, deposited in MNHN. The material is, unless being types (which are allocated to catalogue numbers), unambiguously designated and retrievable by the combination of expedition acronym and station number.

Abbreviations

ASAM: collection Dominique Lamy, AS Antilles Mollusques, Baie-Mahault, Guadeloupe.
IMT: Institute for Malacology Tokyo, Japan.
KF: collection Koen Fraussen, Belgium.
KPM: Kanagawa Prefecture Museum, Yokohama, Japan.
MC: collection Mitsuo Chino, Kawasaki, Japan.
MNHN: Muséum national d'Histoire naturelle, Paris, France.
MP: collection Manfred Parth, Germany.
MZB: Museum of Zoology, Bogor, *Museum Zoologicum Bogoriense*, Pusat Penelitian Biologi, LIPI, Indonesia.
NHM: Natural History Museum, London, England.
PPC: Philippe Poppe collection, Conchology Inc., Cebu, Philippines.
WAM: Western Australian Museum, Perth, Australia.
ZRC: Zoological Reference Collection, Raffles Museum of Biodiversity Research, Singapore.
CC: (chalut à panneaux, crevette) otter trawl, shrimps
CH: (chalut à panneaux, poisson) otter trawl, fish
CP: (chalut à perche) beam trawl
DC: (drague Calypso) Calypso dredge
DE: (drague épibenthique) epibenthic sledge
DW: (drague Warén) Warén dredge
ET: Engel trawl
alc: in alcohol collection (MNHN)
dd: empty shell, dead collected
juv: juvenile or subadult specimen/shell
lv: collected alive

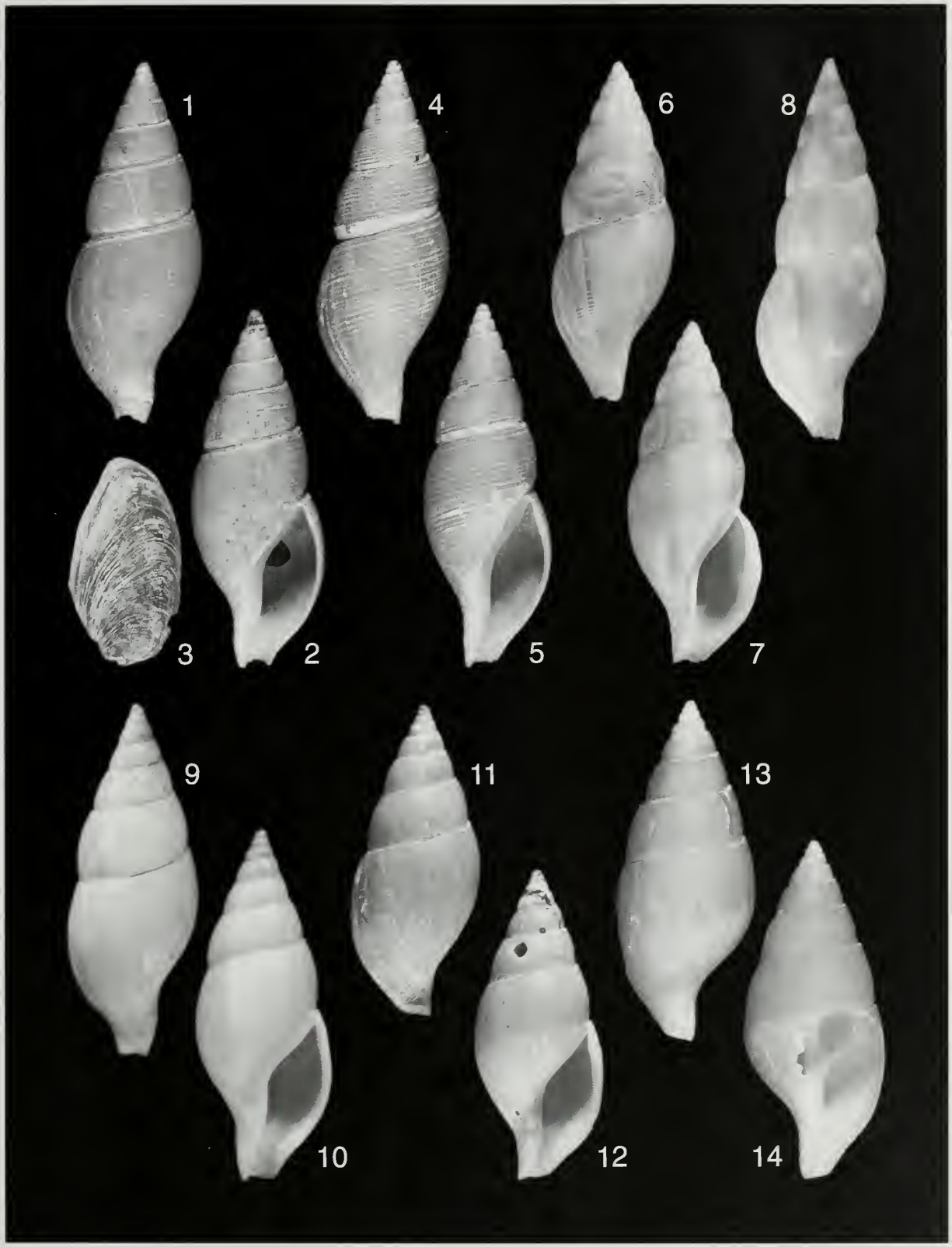
SYSTEMATICS

COLUBRARIIDAE Dall, 1904
Genus ***Kanamarua*** Kuroda, 1951: 69
Type species. *Colus* (*Aulacofusus*) *adonis* Dall, 1919, by original designation, Tropical West Pacific.

Original description. Kuroda (1951: 69-70), translated from Japanese by Mitsuo Chino. "*Dedicated to Mr. T. Tazima Kanamaru, to celebrate his 60th Birthday. Kanamaru greatly contributed in the administration of the society, with special attention for the accounting for more than 20 years, since the beginning of the foundation of Malacological Society of Japan.*
Kanamarua *nov., new genus, type species* Colus (Aulacofusus) adonis *Dall (1919, Proc. U. S. Nat. Mus. 56 (2295): 316. Suruga Gulf, 503 fms. Original author Dall, in 1912 in his second report, classified this species within subgenus* Anomalopsipho [2] *and extended the range to Alaskan waters. We cannot confirm his conclusion because we, unfortunately, cannot clarify the taxonomy of the specimen obtained from that extended part of the range. However, it would be impossible that species from Japan become included in this subgenus, moreover they do not belong to the genus* Colus *either.*".

Figures 1-14

1-5. *Kanamarna narcissisma* sp. nov.,
1-3. holotype, 31.8 mm, operculum 6.9 mm, Indonesia, Tanimbar Islands, KARUBAR, stn CP75, 451-452 m, MNHN-20892; **4-5.** paratype 1, 31.6 mm, Indonesia, Tanimbar Islands, KARUBAR, stn CP72, 676-699 m, MNHN-20893.
6-8. *Kanamarna tazimai* Kuroda, 1951, 6-7: 37.1 mm, 8: 47.0 mm, East China Sea, 150-400 m, KF-4917.
9-14. *Kanamarna adonis* (Dall, 1919)
9-10. 32.2 mm, Japan, Mie Prefecture, 200-300 m, KF-0109; **11-12.** 30.6 mm, Philippines, Luzon, MUSORSTOM 8, stn CP82, 550 m, MNHN; **13-14.** 35.5 mm, Indonesia, Arafura Sea, KARUBAR, stn CP91, 884-891 m, MNHN.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And:
Kuroda (1951: 71), translated from Japanese by Mitsuo Chino. "*These characteristics are sufficient to establish a new genus.*
Protoconch with one and a half whorl, the apex is dull, high, smooth, histrous oval, carnicolor when fresh, gradually becoming darker and horn coloured become the same color as the body whorl
Columella very narrow, umbilicus transparent when seen from below, columellar margin with weak edge, columellar fold weak. Length 37.3 mm, width 13.6 mm, number of whorls 8 1/3. Another specimen: 33.7 mm x 12.4 mm and with 8 whorls.
This genus could be classified close to Metula, *the animal has no radula as is concluded by Dr. Tadashige Habe after anatomical examination of a specimen. The operculum is small, thin, oval, light yellow in colour, the nucleus in almost terminal position.*"

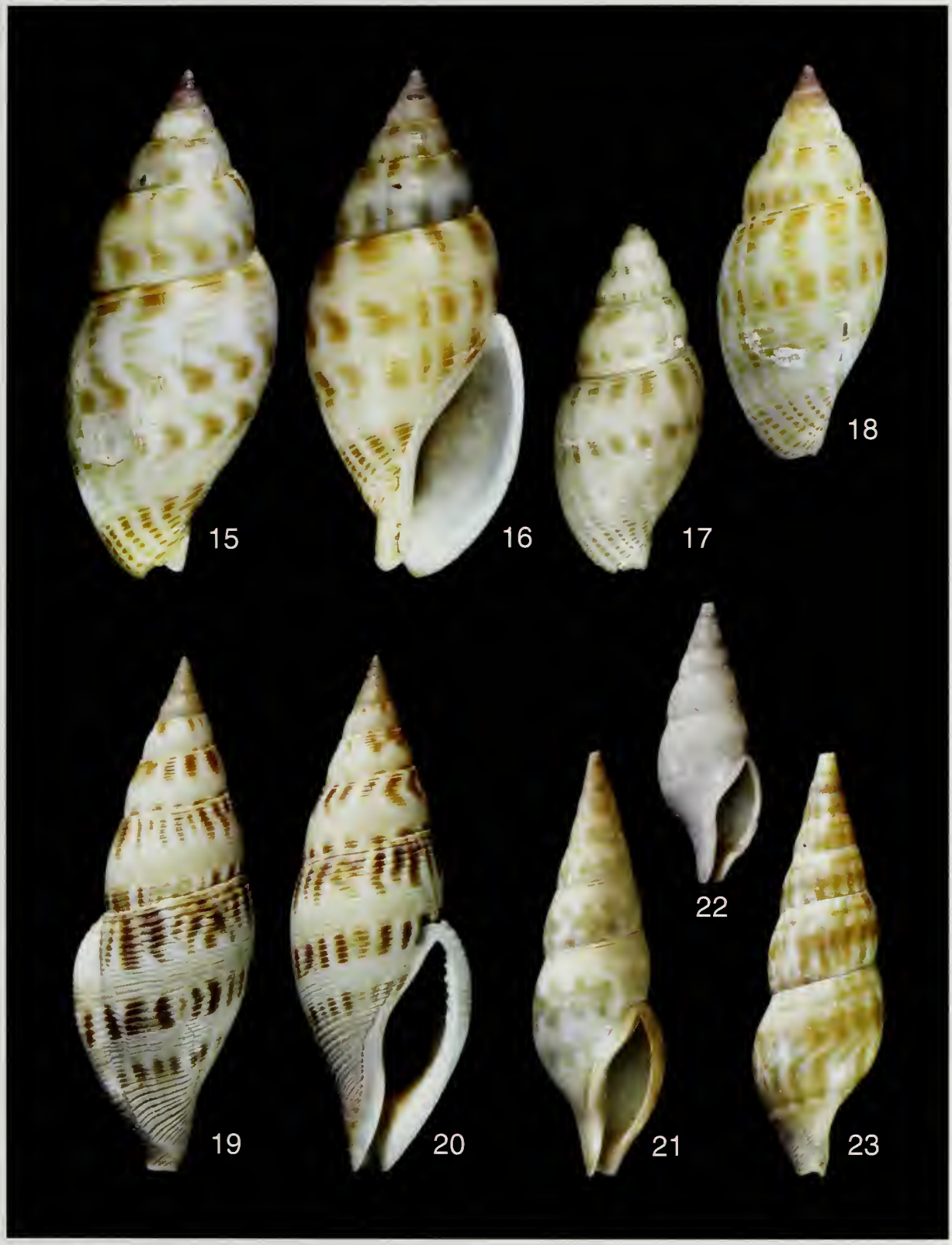
Remarks. The genus *Kanamarua* is characterized by a lens-shaped shell with lens-shaped aperture, a glossy surface with fine and sharp spiral incisions, and a narrow columellar lip. The protoconch is rather blunt, with 1 to 2 1/4 glossy, convex, always smooth whorls. The ground colour of the teleoconch is ranging from white, pale yellowish brown to flesh coloured, occasionally with a flamboyant pattern of dark brown spiral bands with alternating white and brown axial strikes.
No radula was found in *K. adonis* by T. Habe (Kuroda 1951: 71) but recent anatomial investigation on *K. narcissisma* sp. nov. has show traces of a minuscule radula (pers. comm. Y. Kantor) and some colubrariid features.
Metula H. Adams & A. Adams, 1853 is similar in shape but differs by having a granulated spiral sculpture, sharp axial ribs and strong spiral cords on the apical whorls and a multispiral, rather sharp protoconch. Protoconch morphology in *Metula* is quite variable in number of whorls and in shape, ranging from 2 up to 4 whorls and with or without a spiral fold.
Metula amosi Vanatta, 1913, which is the type species of the genus *Metula* H. Adams & A. Adams 1853 (Emerson, 1986: 27-30), has a granulated sculpture and a multispiral protoconch.
Iredalula Finlay, 1926 may be similar in sculpture but differs by having broad spiral interspaces, laterally slightly flattened whorls with a more angulate shoulder and a shorter base in combination with a broader siphonal canal.
Bouchet & Warén (1986: 482) suggested that *Kanamarua* might end up in the synonymy of *Anomalosipho* Dautzenberg & Fischer, 1912 (type species *Neptunea* (*Sipho*) *verkruzeni* Kobelt, 1876, by original designation). *Anomalosipho verkruzeni* (Kobelt, 1876) differs in having a rather thick and more porous shell, a broader aperture, an assymetric and slightly curved operculum with terminal nucleus (instead of oval), a thick greenish periostracum and a buccinid radula.
Kuroda (1951: footnotes, p. 69) translated from Japanese by Mitsuo Chino: "*2) 1912.* 'Sipho (Anomalosipho) verkruzenii *Kobelt', Dautzenberg et Fischer, Res.Camp.Sci.Prince de Monaco, Fasc. 37: 99, pl. 4, fig. 8 [original spelling was* Anomalisipho, *however, index p. 607 misprinted* Anomalosipho.*].*
1876. Sipho verkruzeni *Kobelt, Jahrb. Deutsch. Mal. Ges. 70 pl. 2, figs. 1, a-b. his type specimen has a high spire, the shell covered with a greenish periostracum, the spiral sculpture dense with minute cords, the outer margin recurved, the inner margin without denticles, without axial ribs, as a result it clearly indicates to be a member of the* Colus *Group.*"

Included species

Kanamarua adonis (Dall, 1919)
Kanamarua boswellae (Kilburn, 1975) comb. nov.
Kanamarua francroberti sp. nov.
Kanamarua hyatinthus Shikama, 1973
Kanamarua narcissisma sp. nov.
Kanamarua tazimai Kuroda, 1951
Another species which eventually may become included in the genus *Kanamarua* is *Metula somalica* Bozzetti, 1993. We have no specimens for examination and do not formulate any opinion about its generic position.

Figures 15-23

15-18. *Kanamarua francroberti* sp. nov.,
15-16. holotype, 58.0 mm, Guadeloupe, off Phare de Vieux Fort, 300 m, MNHN-9968; **17.** paratype 1, 47.7 mm, Guadeloupe, north east off Marie Galante Island, 250 m, ASAM; **18.** paratype 2, 40.7 mm, same locality, KF-5190.
19-20. *Kanamarua boswellae* (Kilburn, 1975), 78.9 mm, South Africa, Natal, deep water, KF-2634.
21-23. *Kanamarua hyatinthus* Shikama, 1973,
21-22. 21: 57.9 mm, 22: 42.5 mm Somalia, Ras Hafun, deep water, KF-1224; **23.** 58.1 mm, Philippines, Balicasag Island, deep water, KF-2748.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Kanamarua adonis (Dall, 1919)
Figs 9-14, 31-32

Colus (Aulacofusus) adonis Dall, 1919: 316. Type locality: "U. S. Bureau of Fisheries station 5053, in Suruga Gulf, Japan, in 503 fathoms, mud; bottom temperature, 34.9° F.".

Tritonofusus adonis – Dall, 1918: 218, *nomen nudum.*
Anomalosipho adonis – Dall, 1921: 95.
Colus adonis – Dall 1925: 11, pl. 1, fig. 8.
Colus adonis – Oldroyd, 1927: 222-223, pl. 13, fig. 8.
Colus (*Anomalosipho*) *adonis* – Kuroda,1936: 181.
Kanamarua adonis – Kuroda, 1951: 70-71.
Colus (*Anomalosipho*) *adonis* – La Roque, 1953: 208.
Colus (*Anomalosipho*) *adonis* – Abbott, R. T., 1974: 210.
Kanamarua adonis – Kira, 1955: 52-53, pl. 26, fig. 6.
Kanamarua adonis – Habe & Ito, 1965: 48, pl. 13, fig. 27.
"Colus adonis" – Kosuge, 1975: pl. 12, fig. 3.
Kanamarua adonis – Habe & Okutani, 1975: 120, fig.
Kanamarua adonis – Bouchet & Warén, 1986: 482-483, figs. 100-101.
Kanamarua adonis – Okutani, 2000: 500-501, pl. 249, fig. 1.

Original description. Dall (1919: 316). Shell small, bulimiform, thin, whitish with a pale olive periostracum, with about six whorls exclusive of the (lost) nucleus, with a very narrowly channeled suture and moderately rounded whorls; spiral sculpture of narrow equal flat threads (about three to a millimeter) with very narrow interspaces over the whole shell, though the interspaces are a little wider on the apical whorls and the spirals under-run there by thread-like axial sculpture, giving a somewhat punctate appearance under magnification; aperture elongate, rather narrow, the outer lip thickened, not reflected, with traces of liration near the inside margin; the body and pillar with a continuous layer of enamel; canal short, wide, with no siphonal fasciole. Height of shell, 37; of last whorl, 25; diameter, 15 mm.

Material examined. Indonesia: Makassar, CORINDON stn CH214, 00°31N, 117°50'E, 595 m, 1 lv juv, MNHN. - Tanimbar Islands, KARUBAR stn CP91, 08°44'S, 131°05'E, 884-891 m, 1 dd, MNHN.
Japan: Honshu, Shikoku, Kiisuido, 180 m, 1 dd, MNHN. - Off Maisaka, Shigaoka Prefecture, 250 m, 1 lv MC, 2 dd KF-5438. - Off Cape Shiono, 200 m, 1 dd, KF-3464. - Mie Prefecture, trawled, 200-300 m, 2 lv, KF-0109.
Philippines: Luzon, east off Lubang Island, MUSORSTOM 2 stn CP82, 13°47'N, 120°29'E, 550 m, 2 dd, MNHN. - Mindoro, south off Templo Island, MUSORSTOM 3 stn CP118, 11°58'N, 121°06'E, 448-466 m, 3 dd, MNHN.

Range and habitat. Previously known from Japan and Taiwan, the range is here extended into Indonesia and the central Philippines.
The species is recorded from the American West Coast by Dall (1921: 95) and Oldroyd (1927: 222-223), but we agree with Bouchet and Warén (1986: 483) that this record is rather doubtful.

Remarks. Kuroda (1951: 70-71), translated from Japanese by Mitsuo Chino. "*The range of* C. adonis *is Suruga Bay and Tosa, Kii. The shell is shaped as a willow leave, fusiform, with minute sculpture, the upper whorls delicately reticulated. The last whorl is obviously similar to the description by Dall. The aperture is stretched ahead towards posterior canal, the outer lip is thin but with distinct varix. The inner lip has a thick columellar, the margin is rather distinct, recurved, inner side of callous having 4-5 denticles in upper (posterior) part, and slightly curved. Inner part callous in anterior denticle knobs gradually weakened counting 16 to18. Suture with strong edge, the outer margin somewhat reminds that of* Colubraria *species, but is weaker.*
The shells sculpture and the overall shell shape resembles the genus Metula, *the sculpture is weak, the spire short, the anterior canal rather long, the whole shell is very thin.*"
Kanamarua adonis is characterized by a broad, lens-shaped shell with numerous fine spiral grooves. The specimens from Indonesia are slightly different from Japanese specimens by having a coarser periostracum and a more accentuated suture.
Kanamarua tazimai differs by having slightly wider, more numerous spiral interspaces and by the presence of fine axial lines.

Kanamarua tazimai Kuroda, 1951
Figs 6-8, 29-30

Kanamarua tazimai Kuroda, 1951: 71.

Kanamarua tajimai – Habe & Okutani, 1975: 120, fig.
Kanamarua tajimai – Matsumoto, 1979: 52.
Kanamarua tazimai – Bouchet & Warén, 1986: 482 (with the original description translated from Japanese to English).
Kanamarua adonis tazimai – Okutani, 2000: 500-501, pl. 249, fig. 2.

Original description. Kuroda (1951: 71) translated from Japanese by Mitsuo Chino. "*As 2 very different types dwell sympatrically, therefore we have to give the new species a name.* Kanamarua tazimai, *if these variations are not caused by sexual nature. This type is very small and thin, rather slender, with a weak sculpture, counting only 6 1/2 whorls, the anterior canal seems slightly recurved, the outer apertural lip has no lirae inside (the canal is not fully matured),*

axial ribs are not significant. Height 21.0 mm, width 8.3 mm, another specimen is 21.5 mm x 8.0 mm. (tazimai *). Collected by Mr. Akibumi Teramachi from off Muroto, Tosa, 120/150 fms deep.*"

Material examined. Japan: Mie Prefecture, off Owase, 250 m, 5 lv, MC. - 450 m, 1 lv juv, KF-3305. - off; Owase, 250 m, 2 dd MC, 3 dd KF-5439. - Okinawa, Okima-Daito-Jima, 200 m, 1 lv MC, 3 dd KF-5437.
China: East China Sea, trawled by Chinese fishermen, 150-400 m, 3 lv, KF-4917.
Philippines: Balut Island, tangle nets, 150 m, 1 lv, PPC-333543.

Range and habitat. Previously known from Japan and East China Sea, the range is here extended into the central Philippines. In the northern part of the range (Japan) only known from deep water, the upper bathymetric limit in the East China Sea and Philippines is found in shallower waters.

Remarks. *Kanamarua tazimai* is characterized by having spiral interspaces on the upper spire whorls which are crossed by incremental lines, giving the sculpture a rather reticulate appearance. Occasionally with some axial pattern. The Japanese specimens (deep water) are small, when compared to the specimens from East China Sea and the Philippines, and their sculpture seems smoother. We regards these weak differences as included within the variability of the species.
K. adonis differs by having a smoother sculpture consisting of lesser and finer spiral lines and a broader shape.

Kanamarua narcissisma sp. nov.
Figs 1-5, 24-28

Type material. Holotype (31.8 mm) (KARUBAR stn CP75), MNHN-20892. Paratypes 1-3 (KARUBAR stn CP72), MNHN-20893, ZRC mol.101, KF-4959. Paratypes 4-5 (KARUBAR stn CP33), MNHN-20894, MZB.

Material examinated. Indonesia: Tanimbar Islands, KARUBAR stn CP59, 08°20'S, 132°11'E, 399-405m, 1 dd juv. - Stn CP69, 08°42'S, 131°53'E, 356-368 m, 4 dd (2 juv). - Stn CP70, 08°41'S, 131°47'E, 410-413 m, 3 dd (2 juv). - Stn CP72, 08°36'S, 131°33'E, 676-699 m, 4 dd (1 juv). - Stn CP75, 08°46'S, 131°36'E, 451-452 m, 1 lv. - Stn CP77, 08°57'S, 131°27'E, 346-352 m, 1 dd juv, MNHN.
Australia: NW off Port Hedland, 480 m, 2 dd, MNHN. - Queensland, Capricorn Channel, deep water, 1 lv juv, KF-3850.
Type locality. Indonesia, Tanimbar Islands, N/O " Baruna Jaya 1" KARUBAR stn CP75, 08°46'S, 131°36'E, 451-452 m.

Range and habitat. Known from Indonesia (off Tanimbar Islands) and western Australia (off Port Hedland). Bathymetric range 451-452 m for living specimens. Empty shells between 352 and 676 m.

Description. Shell up to 41 mm in length, thin, solid, semi transparant, white. Lens shaped, slender, with high spire and short siphonal canal. Teleoconch with 6 whorls. Suture deep.
Protoconch white, smooth, consisting of 1 1/2 whorls. Diameter 1.2 mm. Transition to teleoconch marked by minute axial thread.
Fifth teleoconch whorl with 8 flat, broad spiral cords and 1 fine subsutural cord. Interspaces fine. Second whorl with 9 spiral cords. Third whorl with 13 spiral cords, interspaces becoming deeper and slightly broader. Penultimate whorl with 17 spiral cords, subsutural one fine, interspace between subsutural and second cord deepest. Body whorl with 49 spiral cords, of which about 10 on siphonal canal.
Axial sculpture absent, occasionally consisting of fine axial lines on upper spire whorls, giving a reticulate appearance.
Aperture semi-oval, gently narrowing towards siphonal canal without any constriction. Outer lip thin, smooth, without lirae within. Columella smooth, without denticles. Aperture and siphonal canal together 1/2 of total shell length.
Periostracum thin, smooth, olive green, base and siphonal canal slightly paler, occasionally forming fine incremental lamellae in spiral interspaces.
Operculum thin, corneous, pale brown, nucleus terminal, pointed.

Remarks. *Kanamarua narcissisma* sp. nov. is characterized by a slender shell with numerous fine spiral cords and rather narrow but deep interspaces.
Kanamarua adonis and *K. tazimai* both differ by having a broader shape, a smoother shell and fine spiral interspaces.

Etymology. *Kanamarua narcissisma* sp. nov. is derived from the expresion "narcissism" ("Narzissismus" German) and named after another adonis: *Narkissos* (Greek, a beautiful youth in the mythologic "Metamorphosis" in ancient Greece).

Kanamarua hyatinthus Shikama, 1973
Text Fig. A, Figs 21-23, 34

Kanamarua hyatinthus Shikama, 1973: 7, pl. 2, fig. 15-16. Type locality: Taiwan.

Kanamarua rehderi Kilburn, 1977: 193-194, fig. 21. Type locality: southern Mozambique, between Inhaca Island and Ponto Zavora, ex pisce, 160 m deep.

Metula vicdani Kosuge, 1989: 130-131, pl. 50, fig. 1-4. Type locality: Philippines, Bohol, Panglao, 230-240 m deep. Holotype in IMT-88-176.

Kanamarua hyatinthus – Bouchet & Warén, 1986: 482.
Metula vicdani – Angioy, 1994: 4, fig.
Kanamarua rehderi – Bozzetti, 1994: 37-38, fig.
Kanamarua rehderi – Bozzetti, 1995: 76, fig.
Acamptochetus hyatinthus – Okutani, 2000: 500-501, pl. 249, fig. 3.

Fig. A. *Kanamarua hyatinthus* Shikama, 1973, holotype, 49mm, KPM-3818.

Material examined. Somalia: off Ras Hafun, trawled by fishermen, 150 m, 2dd, KF-1224. - Somalia, trawled by fisherman, 1 dd, MP.

Philippines: MUSORSTOM 2 stn 19, 14°00'5N, 120°16'5'E, 189-192 m, 1 lv dd, MNHN. - Balut Island, by local fishermen, 1 dd, KF-4373. - Balicasag Island, tangle nets in deep water by local fishermen, 1 dd, KF-2748. - Aliguay Island, trawled, 60-120 m, 1 dd, PPC-000626. - Aliguay Island, trawled, 50-150 m, 1 lv juv, KF-5304.
Vanuatu: MUSORSTOM 8 stn DW1141, 15°48'S, 167°08'E, 254-255 m, 1 dd juv, MNHN.

Range and habitat. Indo-West Pacific. Known from Mozambique and Somalia in the east, along Taiwan and Philippines, to Vanuatu in the west.

Remarks. *Kanamarua hyatinthus* is characterized by a slender shell with a high, sharp spire, a glossy surface with fine spiral incisions and usually a dark spiral band in between the centraly situated blotches. Empty collected shells usually have the pattern faded and may have a quite different appearance when compared with alive or fresh collected specimens. All specimens studied by us have a pattern based on the same, for the species characteristic, spiral bands in combination with short, curved, white axial flammulation.
All specimens known to us from the western Indian Ocean (often recorded as the distinct species *K. rehderi*) have a broken protoconch, but the teleoconch is identical in sculpture and pattern with the eastern specimens. Consequently we regard *K. rehderi* a junior synonym of *K. hyatinthus*.

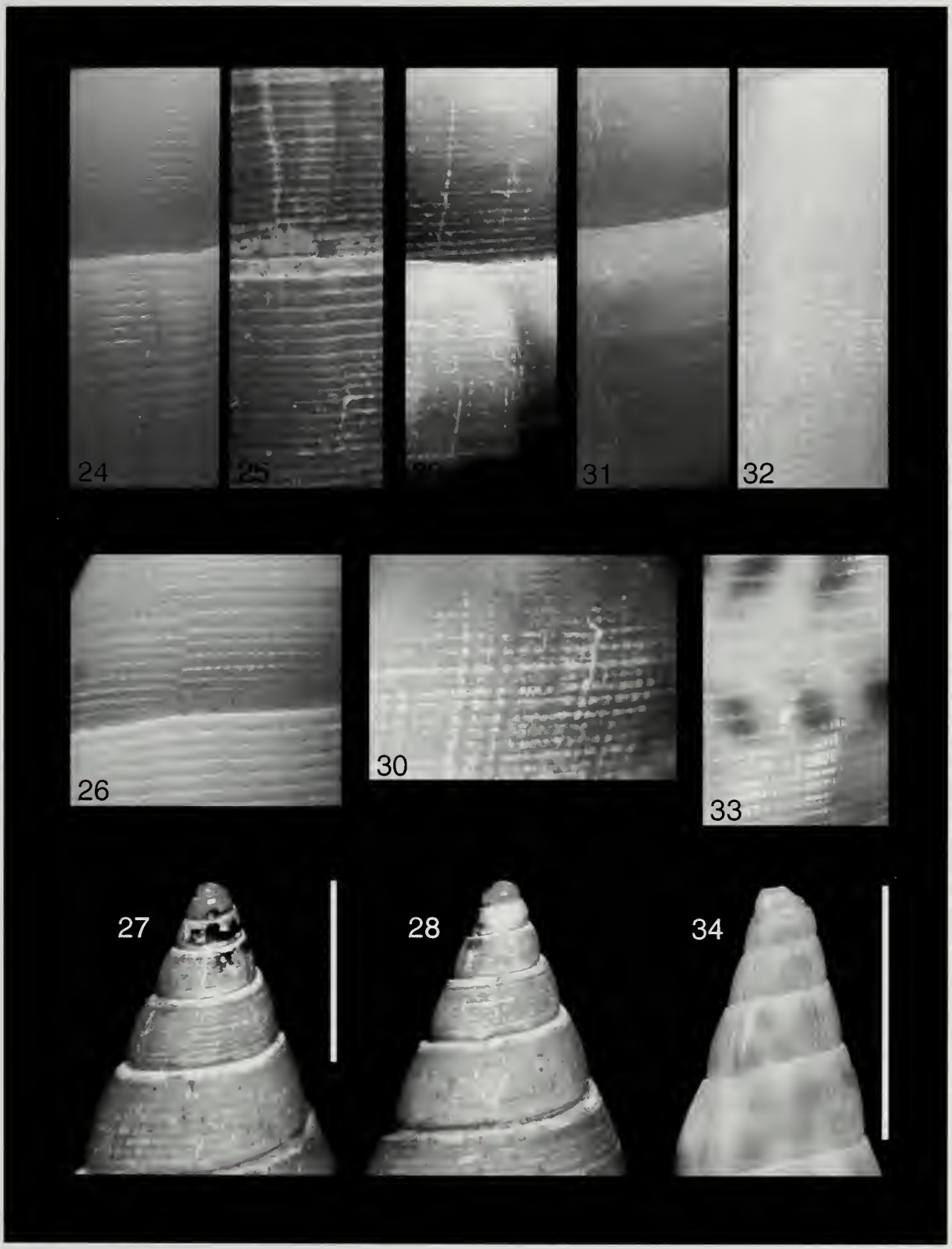
Kanamarua boswellae (Kilburn, 1975)
comb. nov.
Figs 19-20

Metula boswellae Kilburn, 1975: 594-595, fig. 10 b-c. Type locality: Mozambique.

Metula boswellae – Emerson 1986: 28.
Metula boswellae – Parth, 1992: 51, fig. 6.
Metula boswellae – Bozzetti, 1993: 111.
Metula boswellae – anonymous, La Conchiglia, 1994: 40, fig.
Metula boswellae – Bozzetti, 1995: 73, text fig.

Figures 24-34

24-28. *Kanamarua narcissisma* sp. nov.,
24. Australia: NW off Port Hedland, 480 m, MNHN; **25.** sculpture of holotype, MNHN-20893; **26.** Queensland, Capricorn Channel, deep water, KF-3850; **27-28.** scalebar 5 mm, protoconch of holotype, MNHN-20892.
29-30. *Kanamarua tazinai* Kuroda, 1951, East China Sea, KF-4917.
31-32. *Kanamarua adonis* (Dall, 1919),
31. Japan, off Cape Shiono, 200 m, KF-3464; **32.** Japan, Mie Prefecture, 200-300 m, KF-0109.
33. *Kanamarua francroberti* sp. nov., sculpture of paratype 1, ASAM.
34. *Kanamarua hyatinthus* Shikama, 1973, scalebar 5 mm, apex of juvenile with chipped protoconch, Vanuatu, MUSORSTOM 8, stn DW1141, 254-255 m, MNHN.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Material examined. Gulf of Aden: south off Yemen, trawled by fishermen, 100 m, 1dd, KF-1461.
Mozambique: trawled by fishermen, deep water, 3 dd, KF-0729.
South Africa: Natal: off Durban, trawled by fishermen, deep water, 1 lv, KF-2634. - off Zululand, trawled by fishermen, deep water, 4dd, KF-4247.

Range and habitat. Eastern Africa. Known from the Gulf of Aden in the north, along Mozambique, to South Africa in the south.

Remarks. *Kanamarua boswellae* comb. nov. is characterized by a thick, heavy shell sculptured with fine spiral grooves which are characteristic for *Kanamarua*, glossy and smooth protoconch whorls and a thick outer lip with apertural denticles inside. The peculiar pattern consists of 3 broad bands of rather rectangular reddish brown blotches on a flesh coloured background., giving the shell the appearance of *Metula*.

Kanamarua francroberti sp. nov.
Figs 15-18, 33

Type material. Holotype, 58.0 x 25.4 mm, Guadeloupe, off Phare de Vieux Fort, 300 m, 4/2002, in MNHN-9968. Paratype 1, 47.7 x 20.9 mm; Guadeloupe, north east off Marie Galante Island, 250 m, coll. ASAM. Paratype 2, 40.7 x 18.2 mm, same locality, KF-5190.

Type locality. Guadeloupe, off Phare de Vieux Fort, 300 m.

Range. Only known from the type material from Guadeloupe.
Description. Shell thin, rather fragile, large, up to 58.3 mm in length. Shape broad, rather ovoid, spire short for genus. Aperture slightly longer than 1/2 of total shell length. Whorls weakly convex, glossy, suture deep. Colour pinkish brown, pattern consisting of 4 brown, interrupted bands forming irregular blotches (on body whorl, 2 visible on spire whorl). Subsutural band consisting of rather rectangular blotches, peripheral bands consisting of curved axial streaks, band on siphonal canal consisting of narrow axial streaks.
Protoconch consiting of 2 1/4 smooth, rather convex whorls with slightly angular shoulder, tip flattened, suture deep. Diameter 1.6 mm. Transition to teleoconch distinct, marked by a fine, slightly flared larval lip.
Teleoconch consisting of 6 1/4 weakly convex whorls. Upper spire whorls with 7 fine, equally spaced spiral grooves, subsutural one slightly broader separating a fine, convex subsutural spiral cord. Penultimate whorl with 10 fine spiral grooves, occasionally an additional finer, almost invisible, secondary spiral groove in between. Body whorl with numerous fine spiral grooves of different strength, often alternating well visible (fine) and obscure (even finer). About 8 slightly broader spiral grooves on siphonal canal. Axial pattern on siphonal canal accentuated on top of spirals, paler in interspaces.
Aperture narrow, lens-shaped. Outer lip white, rather thick, simple, edge rather smooth with some weak, irregular nodulation. Columella white, smooth, callus adapically thin, abapically forming a thin lip. Siphonal notch simple, broad, open.
Animal, operculum and radula unknown.

Comparison. *Kanamarua francroberti* sp. nov. is characterized by having a broad shape, a rather smooth surface and four spiral bands with brownish dots.
The generic placement of *Kanamarua francroberti* sp. nov. is based on the spiral sculpture consisting of fine grooves, the smooth and glossy protoconch whorls, the narrow, lens-shaped aperture with some fine nodulations inside the outer lip and the thin and narrow columellar lip.
Kanamarua boswellae (Kilburn, 1975) comb. nov. is similar in pattern and sculpture but differs by having a slender shape with less convex whorls, stronger spiral grooves with broader interspaces and a thick outer lip.
Species belonging to the genera *Casmaria* H. Adams & A. Adams, 1873 (type species *Buccinum vibex* Linnaeus, 1758, subsequent designation by Harris, 1897, = *C. erinacea* (Linnaeus, 1758), Indo-Pacific) and *Semicassis* Mörch, 1852 (type species *Cassis japonica* Reeve, 1848, subsequent designation by Harris, 1897, = *S. bisulcata* (Schubert & Wagner, 1829), Indo-Pacific), which both belong to Cassidae Swainson, 1832, may look similar in shape and pattern but differ by having a broader and twisted columellar fold, a curled and slightly longer siphonal canal and a deeper siphonal notch.
Species belonging to the genus *Lyria* Gray, 1847 (type species *Lyria pattersonia* Perry, 1811, West Pacific), belonging to Volutidae Rafinesque, 1815, may look similar in shape and pattern but differ by the presence of columellar folds and by the outer lip that curls outwards with a smooth inner side.

Etymology. This species is named to honour Francis Robert (Guadeloupe), who collected the type material during his work as a fisherman, for his contributions to the knowledge of the local malacofauna.

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